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10/567,552	02/08/2006	Richard Harding	MERCK-3144	9249

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EXAMINER
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ART UNIT	PAPER NUMBER
1798	

NOTIFICATION DATE	DELIVERY MODE
01/24/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@mwzb.com

Office Action Summary	Application No.	Applicant(s)	
	10/567,552	HARDING ET AL.	
	Examiner	Art Unit	
	SOPHIE HON	1798	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10/22/10*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7,10-12,14,15 and 17-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☒ Claim(s) *8,9 and 13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/22/10*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The 35 U.S.C. 102(b) rejection of claim 15 over Coates is withdrawn due to Applicant's amendment dated 10/22/10.

Response to Arguments

Withdrawn Rejections

2. The 35 U.S.C. 103(a) rejections of claims 1-11, 14, 17-38, 40-41 over Ito as the primary reference, are withdrawn due to Applicant's arguments dated 10/22/10.

New Rejections

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

3. Claims 15, 42-48 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 15 depends on claim 1, and claims 42-48 depend on claim 15. While parent claim 1 recites an alignment layer, claim 15 recites a polymer precursor for preparing the alignment layer of claim 1. It is unclear whether it is the alignment layer that is being claimed in claim 15 and its dependent claims, or just the polymer precursor for preparing the alignment layer. Furthermore, it is unclear how

the polymer film can be a TAC or DAC film in claim 44, when claim 15 recites a polyimide.

Claim Rejections - 35 USC § 102

4. Claims 1, 3-6, 17-21, 27-28, 31, 33-35, 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Winkler2 (US 6,538,712).

Regarding claims 1, 3, 28, 31, Winkler2 teaches an alignment layer for aligning liquid crystal molecules, said alignment layer comprising (a) a polymer film formed from a polymer (polyimide, column 7, lines 55-60) which is soluble in monochlorobenzene (column 8, lines 17-18). Winkler2 teaches that a solution of reactive mesogen in monomeric form is coated onto the polymer film of the alignment layer after preparation of said alignment layer (column 8, lines 49-50) where the solvent is monochlorobenzene (column 8, lines 65-67, column 9, line 1) and thus (b) at least one of the reactive mesogen in monomeric form is expected to infiltrate the polymer layer, the solvent monochlorobenzene being a carrier, and hence be present within the polymer film of the alignment layer after preparation of said alignment layer. As such, the alignment layer contains unreacted polymerizable groups in said at least one reactive mesogen which is not said polymer used to form said polymer film of said alignment layer. The amount of infiltrated reactive mesogen monomer is not expected to be large since the infiltration time is short (30 seconds to 5 minutes, column 9, lines 20-24), and thus corresponds to a small amount relative to the bulk of the polymer film, which is characteristic of an additive.

Regarding claim 4, although Winkler2 fails to teach that the alignment layer is obtainable from a precursor material comprising at least one reactive mesogen, and even though product by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. See MPEP 2113. In the instant case, Winkler2 teaches the alignment layer comprising (a) polymer film formed from a polymer and (b) at least one reactive mesogen additive in monomeric form within said polymer film, as described above.

Regarding claim 5, Winkler2 teaches that the alignment layer is a solvent processed film wherein said alignment layer is formed from a solution of said polymer (solvent cast, column 8, lines 6-10).

Regarding claim 6, Winkler2 teaches that the polymer film is a solvent processed polyimide film (solvent cast, column 8, lines 6-10, polyimide, column 7, lines 55-60). Although Winkler2 fails to teach that the alignment layer is obtained from a precursor solution of polyimide precursor and said at least one reactive mesogen, and even though product by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. See

MPEP 2113. In the instant case, Winkler2 teaches the alignment layer comprising (a) a polyimide film and (b) at least one reactive mesogen additive in monomeric form within said polyimide film, as described above.

Regarding claim 17, Winkler2 teaches a laminate comprising the alignment layer and a film comprising a polymerized liquid crystal material (abstract).

Regarding claim 18, Winkler2 teaches a method of preparing a laminate, said method comprising providing a layer of polymerizable liquid crystal material onto an alignment layer, aligning the liquid crystal material into uniform orientation, and polymerizing the liquid crystal material (abstract).

Regarding claims 19-21, Winkler2 teaches a liquid crystal display device, which is an electro-optical device, comprising the alignment layer (column 7, lines 45-60).

Regarding claim 27, although Winkler2 fails to teach that the alignment layer is obtained from a polymer precursor or polymer precursor solution to which said at least one reactive mesogen is added before processing or polymerizing of the polymer precursor, and even though product by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. See MPEP 2113. In the instant case, Winkler2 teaches the alignment layer comprising (a) a polymer film formed from a polymer and (b) at least one reactive mesogen additive in monomeric form within said polymer film, as described above, where said at least one

reactive mesogen is physically trapped within said polymer in that it is trapped within the polymer matrix upon evaporation of the solvent carrier after solvent-processing as described above.

Regarding claim 33, although Winkler2 fails to teach that the alignment layer is obtainable from a precursor material comprising said at least one reactive mesogen and material for forming said polymer film, and even though product by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. See MPEP 2113. In the instant case, Winkler2 teaches the alignment layer comprising (a) a polymer film formed from a polymer and (b) at least one reactive mesogen additive in monomeric form within said polymer film, as described above.

Regarding claim 34, although Winkler2 fails to teach that said alignment layer is obtained by applying to a substrate a precursor material comprising a solution of the polymer used to form said polymer film, wherein said solution further contains said at least one reactive mesogen, where the solution is then heated to remove excess solvent, and even though product by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is

unpatentable even though the prior product was made by a different process. See MPEP 2113. In the instant case, Winkler2 teaches the alignment layer comprising (a) a polymer film formed from a polymer and (b) at least one reactive mesogen additive in monomeric form within said polymer film, as described above.

Regarding claim 35, although Winkler2 fails to teach that the alignment layer is obtained by applying to a substrate a precursor material comprising said at least one reactive mesogen and a polymer precursor for forming said polymer film, and then subjecting the precursor material to polymerization, and even though product by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. See MPEP 2113. In the instant case, Winkler2 teaches the alignment layer comprising (a) a polymer film formed from a polymer and (b) at least one reactive mesogen additive in monomeric form within said polymer film, as described above.

Regarding claim 38, Winkler2 teaches an alignment layer for aligning liquid crystal molecules, said alignment layer comprising (a) a polymer film formed from a polymer (polyimide, column 7, lines 55-60) which is soluble in monochlorobenzene (column 8, lines 17-18). Winkler2 teaches that a solution of reactive mesogen in monomeric form is coated onto the polymer film of the alignment layer after preparation of said alignment layer (column 8, lines 49-50) where the solvent is monochlorobenzene

(column 8, lines 65-67, column 9, line 1) and thus (b) at least one of the reactive mesogen in monomeric form is expected to infiltrate the polymer layer, the solvent monochlorobenzene being a carrier, and thus be present within the polymer film of the alignment layer after preparation of said alignment layer. As such, the alignment layer contains unreacted polymerizable groups in said at least one reactive mesogen which is not said polymer used to form said polymer film of said alignment layer. The amount of infiltrated reactive mesogen monomer is not expected to be large since the infiltration time is short (30 seconds to 5 minutes, column 9, lines 20-24), and thus corresponds to a small amount relative to the bulk of the polymer film, which is characteristic of an additive.

5. Claims 15, 42, 47-48 are rejected under 35 U.S.C. 102(b) as being anticipated by Kumar, WO01/18594 (US 6,939,587 is the US equivalent that is used here).

Regarding claim 15, Kumar teaches a polymer precursor for preparing an alignment layer comprising at least one polymerizable mesogen and a polyimide polymer (reactive liquid crystal monomer, aligning agent such as a low-temperature-curable polyimide, column 8, lines 8-10. alignment, column 8, lines 20-25).

Regarding claims 42, 47-48, Kumar teaches that phase separation of the reactive mesogen from the polymer precursor is induced by irradiation of polarized UV light (reactive liquid crystal, column 8, lines 20-25). Thus the amount of reactive mesogen remaining in the polymer precursor after phase separation is expected to be very small. As such, in the absence of a showing to the contrary, the amount of residual reactive

mesogen is expected to be well within the claimed range of less than 50% by weight, and to overlap the claimed range of 0.5 to 4%, or 1 to 2%.

Claim Rejections - 35 USC § 103

6. Claims 2, 14, 22-24, 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Winkler2 as applied to claims 1, 3-6, 17-21, 27-28, 31, 33-35, 38 above.

Winkler2 teaches the alignment layer comprising (a) a polymer film formed from a polymer and (b) at least one reactive mesogen additive in monomeric form within said polymer film, as described above.

Regarding claims, 2, 22-24, the amount of infiltrated reactive mesogen is not expected to be large since Winkler2 teaches that the infiltration time is short (30 seconds to 5 minutes, column 9, lines 20-24), and thus corresponds to a small amount relative to the bulk of the polymer film, which is characteristic of an additive, a common amount being one that is within a range of less than 5% by weight, which is within the claimed range of less than 50%, or less than 20% or less than 10%.

Regarding claim 14, the amount of infiltrated reactive mesogen is not expected to be large since Winkler2 teaches that the infiltration time is short (30 seconds to 5 minutes, column 9, lines 20-24), and thus corresponds to a small amount relative to the bulk of the polymer film, which is characteristic of an additive, a common amount being one that is within a range of less than 5% by weight which contains the claimed range of 0.5 to 4%.

Regarding claim 32, the amount of infiltrated reactive mesogen is not expected to be large since Winkler2 teaches that the infiltration time is short (30 seconds to 5 minutes, column 9, lines 20-24), and thus corresponds to a small amount relative to the bulk of the polymer film, which is characteristic of an additive, a common amount being one that is within a range of less than 5% by weight which contains the claimed range of 1 to 2%.

Although Winkler2 fails to teach that the alignment layer is obtainable from a precursor material that comprises 1 to 2% of said at least one reactive mesogen, and even though product by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. See MPEP 2113. In the instant case, Winkler2 teaches the alignment layer comprising (a) polymer film formed from a polymer and (b) at least one reactive mesogen additive in monomeric form within said polymer film, as described above.

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Winkler2 as applied to claims 1, 3-6, 17-21, 27-28, 31, 33-35, 38 above, and further in view of Tsuboyama (US 5,099,344).

Winkler2 teaches the alignment layer comprising (a) a polymer film formed from a polymer and (b) at least one reactive mesogen additive in monomeric form within said polymer film, as described above. In addition, Winkler2 teaches that the polymer film is

a polyimide film (column 7, lines 55-60), but is silent regarding the specifics of the polyimide film.

However, Tsuboyama teaches an alignment layer that comprises a polyimide film (column 4, lines 7-15) that has repeating units of formula A of Applicant (column 55, lines 35-50) for the purpose of providing the desired alignment characteristics.

Therefore, since Winkler2 is silent regarding the specifics of the polyimide film, it would have been necessary and hence obvious to have looked to the prior art for a suitable one. As such, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided a polyimide that has repeating units of formula A of Applicant, as a polyimide in the polyimide film of Winkler2, in order to obtain the desired alignment characteristics, as taught by Tsuboyama.

8. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Winkler2 (US 6,538,712) in view of Ichimura (US 6,001,277).

Winkler2 teaches an alignment layer for aligning liquid crystal molecules, said alignment layer comprising (a) a layer (column 7, lines 55-60) which is soluble in monochlorobenzene (column 8, lines 17-18). Winkler2 teaches that a solution of reactive mesogen in monomeric form is coated onto the polymer film of the alignment layer after preparation of said alignment layer (column 8, lines 49-50) where the solvent is monochlorobenzene (column 8, lines 65-67, column 9, line 1) and thus (b) at least one of the reactive mesogen in monomeric form is expected to infiltrate the polymer layer, the solvent monochlorobenzene being a carrier, and thus be present within the polymer film of the alignment layer after preparation of said alignment layer. As such,

the alignment layer contains unreacted polymerizable groups in said at least one reactive mesogen which is not said polymer used to form said polymer film of said alignment layer. The amount of infiltrated reactive mesogen monomer is not expected to be large since the infiltration time is short (30 seconds to 5 minutes, column 9, lines 20-24), and thus corresponds to a small amount relative to the bulk of the polymer film, which is characteristic of an additive. Winkler2 fails to teach that the (a) layer is a command layer comprising an isomerizable azobenzene compound.

However, Ichimura teaches an alignment layer for aligning liquid crystal molecules, where the alignment layer comprises an isomerisable azobenzene compound introduced by a polymeric precursor material comprising at least one reactive mesogen (4-(2-methacryloyloxyethoxy)azobenzene, column 36, lines 60-65, polymer, column 36, lines 1-5), for the purpose of making said alignment layer (a) a command layer wherein changes in the orientational direction of the azobenzene induce a specific alignment of an LC material coated onto said alignment layer, for the purpose of providing the desired alignment switching characteristics.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided (a) a command layer comprising an isomerizable azobenzene compound, wherein changes in the orientational direction of the azobenzene induce a specific alignment of an LC material coated onto said alignment layer, as the (a) layer of the alignment layer of Winkler2, in order to obtain the desired alignment switching characteristics, as taught by Ichimura.

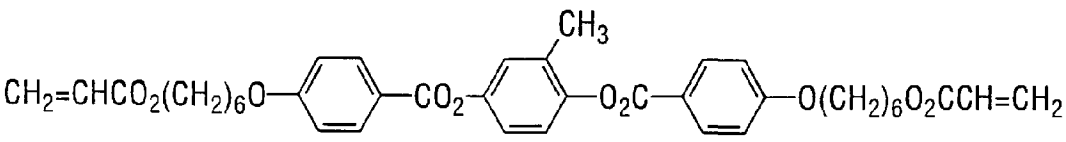
9. Claims 12, 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Winkler2 as applied to claims 1, 3-6, 17-21, 27-28, 31, 33-35, 38 above, and further in view of Winkler4 (US 6,320,634).

Winkler2 teaches the alignment layer, comprising (a) a polymer film formed from a polymer and (b) at least one reactive mesogen in monomer form within said polymer film, as described above.

Regarding claim 12, Winkler2 is silent regarding the details of the reactive mesogen.

However, Winkler2 teaches that the alignment layer is used to form an O-plate compensator (column 6, lines 45-50).

Winkler4 teaches that an O-plate compensator layer (column 11, lines 5-10) is formed from a conventional reactive mesogen show below (C6M, liquid crystal monomer, Fig. 12B, column 10, lines 42-43) that is soluble in monochlorobenzene (C6M, column 11, lines 55-60) which corresponds to a homolog of formula IIa of Applicant where P^1 of Applicant = P^2 of Applicant = CH_2=$CHCO_2$ = polymerizable group, x of Applicant = y of Applicant = 6 instead of 3, g^1 of Applicant = g^2 of Applicant = -O-, L^1 of Applicant = L^2 of Applicant = L^3 of Applicant = L^5 of Applicant = L^6 of Applicant = H, L^4 of Applicant = alkyl group with 1 C atom and Z^3 of Applicant = Z^4 of Applicant = -COO-.



Therefore, since Winkler2 is silent regarding the details of the reactive mesogen, it would have been necessary and hence obvious to have looked to the prior art for a

suitable type. As such, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used a conventional reactive mesogen of formula IIa of Applicant, as the reactive mesogen in the alignment layer of Winkler2, in order to form an O-plate compensator layer, as taught by Winkler4.

Regarding claims 29-30, the amount of infiltrated reactive mesogen is not expected to be large since Winkler2 teaches that the infiltration time is short (30 seconds to 5 minutes, column 9, lines 20-24), and thus corresponds to a small amount relative to the bulk of the polymer film, which is characteristic of an additive, a common amount being one that is within a range of less than 5% by weight, which is within the claimed range of less than 0.5 to 4%, or 1 to 2%

10. Claims 25-26, 36-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Winkler2 as applied to claims 1-6, 14, 17-24, 27-28, 31-35, 38 above, and further in view of Komatsu (US 5,989,758).

Winkler2 teaches (a) a polymer film formed from a polymer and (b) at least one reactive mesogen additive within said polymer film, wherein the least one reactive mesogen is not said polymer used to form said polymer film, and wherein after preparation of said alignment layer, said alignment layer contains unreacted polymerizable groups in said at least one reactive mesogen additive, as described above. Winkler2 is silent regarding the birefringence of the alignment layer before and after addition of said at least one reactive mesogen.

However, Komatsu teaches that an alignment layer can be optically isotropic (orientation substrate, column 24, lines 14-20) which means that the alignment layer

has a birefringence that is ideally zero, which is within the claimed range of less than 0.05, or less than 0.01, or less than 0.005, for the purpose of providing minimal optical interference. Komatsu teaches alignment layers that are non-mesogenic (column 22, lines 9-15) which are more likely to be isotropic.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have made the alignment layer of Winkler2, non-mesogenic, and to have provided it with a birefringence that is within a range of less than 0.05, or less than 0.005, where the birefringence of the alignment layer before addition of said at least one reactive mesogen has a birefringence of less than 0.01, in order to minimize any optical interference, as taught by Komatsu.

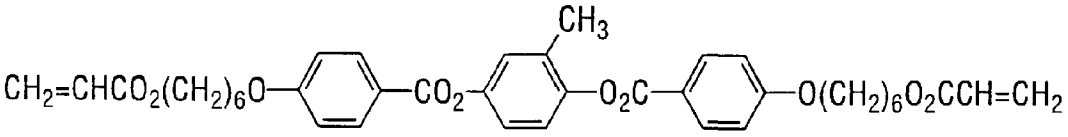
11. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Winkler2 (US 6,538,712) in view of Winkler4 (US 6,320,634).

Winkler2 teaches an alignment layer for aligning liquid crystal molecules, said alignment layer comprising (a) a polymer film formed from a polymer, wherein said polymer film is a polyimide film (column 7, lines 55-60) which is soluble in monochlorobenzene (column 8, lines 17-18). Winkler2 teaches that a solution of reactive mesogen in monomeric form is coated onto the polymer film of the alignment layer after preparation of said alignment layer (column 8, lines 49-50) where the solvent is monochlorobenzene (column 8, lines 65-67, column 9, line 1) and thus (b) at least one of the reactive mesogen in monomeric form is expected to infiltrate the polymer layer, the solvent monochlorobenzene being a carrier, and thus be present within the polymer film of the alignment layer after preparation of said alignment layer. As such,

the alignment layer contains unreacted polymerizable groups in said at least one reactive mesogen which is not said polymer used to form said polymer film of said alignment layer. The amount of infiltrated reactive mesogen monomer is not expected to be large since the infiltration time is short (30 seconds to 5 minutes, column 9, lines 20-24), and thus corresponds to a small amount relative to the bulk of the polymer film, which is characteristic of an additive. Winkler2 is silent regarding the details of the reactive mesogen monomer.

However, Winkler2 teaches that the alignment layer is used to form an O-plate compensator (column 6, lines 45-50).

Winkler4 teaches that an O-plate compensator layer (column 11, lines 5-10) is formed from a conventional reactive mesogen shown below (C6M, liquid crystal monomer, Fig. 12B, column 10, lines 42-43) that is soluble in monochlorobenzene (C6M, column 11, lines 55-60) which corresponds to a homolog of formula IIa of Applicant where P^1 of Applicant = P^2 of Applicant = CH_2=$CHCO_2$ = polymerizable group, x of Applicant = y of Applicant = 6 instead of 3, g^1 of Applicant = g^2 of Applicant = -O-, L^1 of Applicant = L^2 of Applicant = L^3 of Applicant = L^5 of Applicant = L^6 of Applicant = H, L^4 of Applicant = alkyl group with 1 C atom and Z^3 of Applicant = Z^4 of Applicant = -COO-.



Therefore, since Winkler2 is silent regarding the details of the reactive mesogen monomer, it would have been necessary and hence obvious to have looked to the prior art for a suitable type. As such, it would have been obvious to one of ordinary skill in

the art at the time the invention was made, to have used a conventional reactive mesogen monomer of formula IIa of Applicant, as the reactive mesogen monomer in the alignment layer of Winkler2, in order to form an O-plate compensator layer, as taught by Winkler4.

12. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Winkler2 (US 6,538,712) as evidenced by Lacker (US 4,944,576).

Winkler2 teaches an alignment layer for aligning liquid crystal molecules, said alignment layer comprising (a) a layer (column 7, lines 55-60) which is soluble in monochlorobenzene (column 8, lines 17-18). Winkler2 teaches that a solution of reactive mesogen in monomeric form is coated onto the polymer film of the alignment layer after preparation of said alignment layer (column 8, lines 49-50) where the solvent is monochlorobenzene (column 8, lines 65-67, column 9, line 1) and thus (b) at least one of the reactive mesogen in monomeric form is expected to infiltrate the polymer layer, the solvent monochlorobenzene being a carrier, and thus be present within the polymer film of the alignment layer after preparation of said alignment layer. As such, the alignment layer contains unreacted polymerizable groups in said at least one reactive mesogen which is not said polymer used to form said polymer film of said alignment layer. The amount of infiltrated reactive mesogen monomer is not expected to be large since the infiltration time is short (30 seconds to 5 minutes, column 9, lines 20-24), and thus corresponds to a small amount relative to the bulk of the polymer film, which is characteristic of an additive. The reactive mesogen in monomeric form

inherently functions as a plasticizer to improve the processibility of the polymer of the polymer film, as evidenced by Lacker.

Lacker teaches that a mesogen compound inherently functions as a plasticizer to improve the processibility of the polymer matrix (liquid crystal, fraction is retained in the polymer as isotropic plasticizers, column 5, lines 40-45).

13. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Winkler2 (US 6,538,712).

Winkler2 teaches an alignment layer for aligning liquid crystal molecules, said alignment layer comprising (a) a layer (column 7, lines 55-60) which is soluble in monochlorobenzene (column 8, lines 17-18). Winkler2 teaches that a solution of reactive mesogen in monomeric form is coated onto the polymer film of the alignment layer after preparation of said alignment layer (column 8, lines 49-50) where the solvent is monochlorobenzene (column 8, lines 65-67, column 9, line 1) and thus (b) at least one of the reactive mesogen in monomeric form is expected to infiltrate the polymer layer, the solvent monochlorobenzene being a carrier, and thus be present within the polymer film of the alignment layer after preparation of said alignment layer. As such, the alignment layer contains unreacted polymerizable groups in said at least one reactive mesogen which is not said polymer used to form said polymer film of said alignment layer. The amount of infiltrated reactive mesogen monomer is not expected to be large since the infiltration time is short (30 seconds to 5 minutes, column 9, lines 20-24), and thus corresponds to a small amount relative to the bulk of the polymer film,

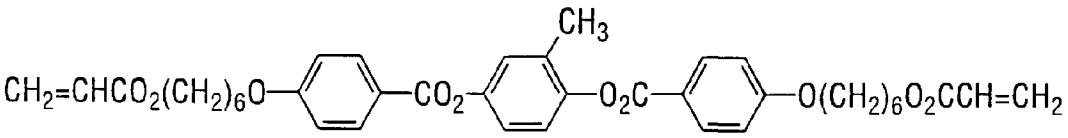
which is characteristic of an additive, a common amount being one that is within a range of less than 5% by weight.

14. Claims 43-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kumar as applied to claims 15, 42, 47-48 above, and further in view of Winkler4 (US 6,320,634).

Kumar teaches a polymer precursor for preparing an alignment layer, comprising at least one reactive mesogen and a polyimide polymer, as described above. Kumar is silent regarding the specific chemical structure of the reactive mesogen aside from teaching that it can be a diacrylate (column 8, lines 45-50).

However, Kumar teaches that the reactive mesogen diacrylate is used to form a birefringent layer (column 7, lines 25-30).

Winkler4 teaches that a birefringent layer (column 9, lines 39-40) can be formed from a conventional reactive mesogen diacrylate shown below (C6M liquid crystal monomer, Fig. 12B, column 10, lines 42-43) which corresponds to a homolog of formula IIa of Applicant where P^1 of Applicant = P^2 of Applicant = CH_2=$CHCO_2$ = polymerizable group, x of Applicant = y of Applicant = 6 instead of 3, g^1 of Applicant = g^2 of Applicant = -O-, L^1 of Applicant = L^2 of Applicant = L^3 of Applicant = L^5 of Applicant = L^6 of Applicant = H, L^4 of Applicant = alkyl group with 1 C atom and Z^3 of Applicant = Z^4 of Applicant = -COO-.



Therefore, since Kumar is silent regarding the specific chemical structure of the reactive mesogen diacrylate, it would have been necessary and hence obvious to have looked to the prior art for a suitable one. As such, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided a conventional reactive mesogen diacrylate of formula IIa of Applicant, as the reactive mesogen diacrylate in the polymer precursor of Kumar, in order to obtain the desired birefringent layer, as taught by Winkler4.

15. Claims 45-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kumar as applied to claims 15, 42, 47-48 above, and further in view of Komatsu (US 5,989,758).

Kumar teaches a polymer precursor for preparing an alignment layer, said polymer precursor comprising at least one reactive mesogen additive and a polyimide polymer, wherein the amount of residual reactive mesogen is expected to be very small after phase separation from the polymer precursor, as described above. Kumar is silent as to whether the polymer precursor can form an alignment layer having a birefringence within a range of less than 0.05 or 0.005.

However, Komatsu teaches that an alignment layer can be optically isotropic (orientation substrate, column 24, lines 14-20) which means that the alignment layer has a birefringence that is ideally zero, which is within the claimed range of less than 0.05, or less than 0.01, or less than 0.005, for the purpose of providing minimal optical interference. Komatsu teaches alignment layers that are non-mesogenic (column 22, lines 9-15) which are more likely to be isotropic.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have made the polymer precursor of Kumar, non-mesogenic, and to have formed it into an alignment layer with a birefringence that is within a range of less than 0.05, or less than 0.005, in order to minimize any optical interference, as taught by Komatsu.

Allowable Subject Matter

16. Claims 8-9, 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. Claim 44 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Response to Arguments

18. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela Ortiz, can be reached at (571)272-1206. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

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/Sophie Hon/

Sow-Fun Hon

Primary Examiner, Art Unit 1798